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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/638,172      | 08/11/2000  | Doug A. Hawks        | 00CON115P           | 8010             |

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EXAMINER

NGO, HUNG V

ART UNIT PAPER NUMBER

2831

DATE MAILED: 07/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/638,172

Applicant(s)  
Hawks et al

Examiner  
Hung V. Ngo

Art Unit  
2831



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Jun 25, 2003
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 11, 14-16, and 18-29 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11, 14-16, and 18-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_ 6) ☐ Other:

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## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 20-23, 25-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Takeda.

Takeda discloses a printed circuit board (1) including a die (2) attached to said printed circuit board; said printed circuit comprising a first layer of metal and a second layer of metal on bottom and top surfaces of the board (Fig 9); a through hole (7) in said printed circuit board, said hole being adjacent to said die, said hole being completely filled with a mold compound (3) such as epoxy (col 6, lines 5-10), said hole being unplated (Fig 9), said mold compound surrounding and covering said die (Fig 9), wherein said mold compound is locked into first and second layers of said printed circuit board, the limitations of "said through hole being completely filled with a mold compound during a molding process" have been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. In re Stephens 145 USPQ 656 (CCPA 1965)(re claims 20, 25).

Re claim 21, 26, bonding wire (6).

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Re claims 22, 23, 27, 28, a layer of die attach (4).

3. Claims 11, 14-16, 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Noguchi.

Noguchi discloses a printed circuit board (1) including a die (Fig 5B) attached to said printed circuit board; said printed circuit comprising a first layer of metal (3) and a second layer of metal on bottom and top surfaces of the board (Fig 5b) ; a blind hole (18) in said printed circuit board, said hole being adjacent to said die, said hole being filled with a mold compound (11), said hole being unplated (Fig 2), said mold compound surrounding and covering said die, wherein said mold compound is locked into second layer of metal of said printed circuit board (Fig 5b)(re claim 11).

Re claim 14, a bond wire (Fig 5b), wherein a first end of said bond wire is bonded to a die bonding pad on said die and a second end of said bond wire is bonded to a printed circuit board bonding location on said printed circuit board.

Re claim 15, wherein said mold compound is selected from the group consisting of multi functional epoxy (resin).

Re claim 16, a layer of die attach (Fig 5b) between said die and said printed circuit board

Re claim 18 the layer of die attach between said die and said second layer of metal (Fig 5b).

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***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi in view of Garbelli et al

The teaching of Noguchi as discussed above does not disclose the second layer of metal comprises gold plated copper.

Garbelli et al disclose a second layer of metal (140) below the die comprising gold plated copper to allow a better compatibility with the layer of die attach and facilitating the heat transfer from the back of the device (col 4, lines 42-48)(Fig 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the gold plated copper for the second layer of metal of Noguchi for the purpose of allowing a better compatibility with the layer of die attach and facilitating the heat transfer from the back of the die as taught by Garbelli et al.

Claims 24, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeda in view of Garbelli et al

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The teaching of Takeda as discussed above does not disclose the second layer of metal comprises gold plated copper.

Garbelli et al disclose a second layer of metal (140) below the die comprising gold plated copper to allow a better compatibility with the layer of die attach and facilitating the heat transfer from the back of the device (col 4, lines 42-48)(Fig 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the gold plated copper for the second layer of metal of Takeda for the purpose of allowing a better compatibility with the layer of die attach and facilitating the heat transfer from the back of the die as taught by Garbelli et al.

### ***Response to Arguments***

Applicant's arguments filed 05-06-03 have been fully considered but they are not persuasive.

Applicant argues (1) that Takeda does not teach or suggest "a through hole traversing said first and second layers of metal of said printed circuit board", "said through hole being filled with a mold compound", (2) that Noguchi does not disclose a blind hole traversing a second layer of metal. The examiner disagrees. Takeda discloses a through hole 7 traversing said first and second layers of metal of said printed circuit board (Fig 9), "said through hole being filled with a mold compound (col 6, lines 5-10), and the through hole of Takeda is functioning as claimed. With

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respect to (2), the blind hole of Noguchi traverse, pass across or pass over a second layer of metal.

*Communication*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung V. Ngo whose telephone number is (703) 308-7614. The examiner can normally be reached on Monday to Friday from 9:30 am to 06:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard, can be reached on (703) 308-3682.

The fax phone number for this Group is (703) 872-9318 (Before Final) or (703) 872-9319 (After Final).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

Hung V. Ngo

July 20, 2003

Hung V. Ngo

**HUNG V. NGO  
PRIMARY EXAMINER**